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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/732,342	12/07/2000	Vamsi Krishna Sangavarapu	JP920000281US1	1472

7590 03/29/2004

ANTHONY ENGLAND
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AUSTIN, TX 78703

EXAMINER

KANG, INSUN

ART UNIT	PAPER NUMBER
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2124

DATE MAILED: 03/29/2004

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/732,342

Applicant(s)

SANGAVARAPU ET AL.

Examiner

Insun Kang

Art Unit

2124

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2000 and 23 April 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the application filed 12/07/2000 and 4/23/2001.
2. Claims 1-51 are pending in the application.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The abstract of the disclosure is objected to because the abstract contains phrases, which can be implied: "are disclosed" in lines 2 and 4. Correction is required.

See MPEP § 608.01(b).

5. The use of the trademark LINUX and UNIX has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner, which might adversely affect their validity as trademarks.

Claim Objections

6. Claims 3, 5, 12, 13, 15, 22, 23, 25, 32, 33, 40, 46 and 47 are objected to because of the following informalities: "readpage" needs to be changed to "reading page" or "read page." Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 2-5, 22-25, 32, 33, 39, 40, 46 and 48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 2, 5, 22, 25, 32, 39 and 46, the term "adapted to" is unclear. It has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138. Correction is required.

Claims 3, 4, 23,24,33,40 and 48 are rejected because of dependency on the above rejected parent claims 2, 5, 22, 25, 32, 39 and 46.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1-7, 11-17, 21-27, 31-34, 37-41 and 45-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Even et al. (US Patent 5,611,043), hereinafter referred to as "Even."

Per claim 1:

Even discloses inserting a software watchpoint in a page containing software code ("setting and clearing watchpoints," abstract) if said page is present in memory ("page frames in the physical memory," col 10 lines 40-51); Even does not explicitly teach inserting a global breakpoint. However, a global breakpoint was well known in the art of Software debugging, at the time applicant's invention was made, to stop the program execution to debug the program. Even does not explicitly teach the watchpoint can function as a breakpoint. A watchpoint disclosed in Even's system stops a program execution when the contents of a set point in the memory become altered. It would have been obvious of one skilled in the art to implement the software watching point as a breakpoint in the memory page by incrementing the content of a location each time the instruction is executed such that a watchpoint stops the program execution in every cycle whether the memory contents become altered. The modification would be

obvious because, by doing so, the watch point would have the same functionality of a breakpoint. Hereinafter, the global breakpoint in the instant dependent claims is interpreted as a watchpoint.

- reading said page into memory if not present in memory ("a page table, with each entry in the table having a present/absent bit for indicating whether a particular page is mapped or not (i.e., present in physical memory)," col 10 lines 39-51), and inserting a global breakpoint in said page immediately after being read into memory ("examine the cause of the exception," col 11 lines 26-45; col 12 lines 47-62; col 10 lines 39-51);
- detecting a private copy of said page if present ("swapping out pages... virtual pages are tracked in a page table," col 10 lines 39-52).

Even discloses Copy-On-Write (COW) mechanism ("examine the cause of the exception," col 11 lines 26-45; PAGE_WRITECOPY," col 18; col 12 lines 47-62) for inserting a global breakpoint in the private copy.

Per claim 2:

The rejection of claim 1 is incorporated, and further, Even discloses a read page process for reading said page into memory and being adapted to insert a global breakpoint in said page immediately after being read into memory ("a page table, with each entry in the table having a present/absent bit for indicating whether a particular page is mapped or not (i.e., present in physical memory)," col 10 lines 39-51)

Per claim 3:

The rejection of claim 2 is incorporated, and further, Even discloses that said read page process is implemented as a kernel routine that is called when said page is loaded into memory ("a page table, with each entry in the table having a present/absent bit for indicating whether a particular page is mapped or not (i.e., present in physical memory)," col 10 lines 39-51)

Per claim 4:

The rejection of claim 2 is incorporated, and further, Even discloses
-setting up an operation to insert said global breakpoint in said page immediately after said page is read into memory by an operating system, if said page is not already in memory ("swapping out pages... virtual pages are tracked in a page table," col 10 lines 39-52).

Per claim 5:

The rejection of claim 4 is incorporated, and further, Even discloses
-changing a file specific readpage process to a wrapper routine that invokes an original readpage process and then performs said operation required (col 10 lines 39-52).

Per claim 6:

The rejection of claim 1 is incorporated, and further, Even discloses
swapping said copy to a swap device after inserting said global breakpoint in said copy("swapping out pages... virtual pages are tracked in a page table," col 10 lines 39-52).

Per claim 7:

The rejection of claim 6 is incorporated, and further, Even discloses marking said copy as dirty after inserting said global breakpoint in said copy ("a page table, with each entry in the table having a present/absent bit for indicating whether a particular page is mapped or not (i.e., present in physical memory)," col 10 lines 39-51), whereby when swapping said copy to said swap device, said global breakpoint being present in said swapped copy ("swapping out pages... virtual pages are tracked in a page table," col 10 lines 39-52).

Per claims 11-17, they are apparatus versions of claims 1-7, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 1-7 above.

Per claims 21-27, they are product versions of claims 1-7, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 1-7 above.

Per claim 31:

Even discloses:

- removing a global breakpoint in a page containing software code ("Swapping out pages," col 10 lines 38-64) if said page containing said global breakpoint is present in memory ("page frames in the physical memory," col 10 lines 40-51)
- detecting a private copy of said page if present ("swapping out pages... virtual pages are tracked in a page table," col 10 lines 39-52), reading said page into

memory if not present in memory("page frames in the physical memory," col 10 lines 40-51), and removing a global breakpoint in said private copy("Swapping out pages," col 10 lines 38-64).

See the rejection of claim 1 above.

Per claim 32:

The rejection of claim 31 is incorporated, and further, Even discloses:

-a readpage process for reading said page into memory and being adapted to remove a global breakpoint in said page immediately after being read into memory("a page table, with each entry in the table having a present/absent bit for indicating whether a particular page is mapped or not (i.e., present in physical memory)," col 10 lines 39-51)

See the rejection of claim 1 above.

Per claim 33:

The rejection of claim 32 is incorporated, and further, Even discloses that said readpage process is implemented as a kernel routine that is called when said page is loaded into memory ("a page table, with each entry in the table having a present/absent bit for indicating whether a particular page is mapped or not (i.e., present in physical memory)," col 10 lines 39-51).

Per claim 34:

The rejection of claim 31 is incorporated, and further, Even discloses that said reading step includes the step of turning off an operation set up earlier for inserting a global breakpoint in said page when said page is read into memory ("swapping out pages...virtual pages are tracked in a page table," col 10 lines 39-52).

Per claims 37-41, they are apparatus versions of claims 31-34, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 31-34 above.

Per claims 45-48, they are product versions of claims 31-34, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 31-34 above.

11. Claims 8-10, 18-20, 28-30, 35-36, 42-44 and 49-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Even et al. (US Patent 5,611,043) hereinafter referred to as "Even" in view of Jenevein et al. (US Patent 6,615,365) hereinafter referred to as "Jenevein."

Per claim 8:

The rejection of claim 1 is incorporated, and further, Even does not explicitly disclose an identifier of a file and an offset in said file. However, Jenevein teaches that a file identifier and a file offset were known in the art of software debugging and development, at the time applicant's invention was made, to represent a file ("offset from beginning of

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file,” col 10 lines 22-65; “the file ID,” col 11 lines 1-15) such as those disclosed in Jenevein. It would have been obvious for one of ordinary skill in the art of computer software development and debugging to modify Even’s disclosed system to use a file identifier and offset. The modification would be obvious because one of ordinary skill in the art would be motivated to use a file identifier to easily identify each file (col 14 lines 50-67).

Per claim 9:

The rejection of claim 8 is incorporated, and further, Even does not explicitly disclose an inode. However, Jenevein teaches that an inode was known in the art of software debugging and development, at the time applicant's invention was made, to represent a file (“inode information in UNIX-like file systems,” col 14 lines 50-67) such as those disclosed in Jenevein.

It would have been obvious for one of ordinary skill in the art of computer software development and debugging to modify Even’s disclosed system to use an inode to represent a file. The modification would be obvious because one of ordinary skill in the art would be motivated to use an inode as a file identifier to provide important information on files such as user and group ownership, access mode (read, write, execute permissions) and type (col 14 lines 50-67).

Per claim 10:

The rejection of claim 8 is incorporated, and further, Even discloses a lookup table ("page table," col 10 lines 38-52).

Per claims 18-20, the rejection of claim 11 is incorporated, further, they are apparatus versions of claims 8-10, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 8-10 above.

Per claims 28-30, the rejection of claim 21 is incorporated, further, they are apparatus versions of claims 8-10, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 8-10 above.

Per claims 35-37, the rejection of claim 31 is incorporated, further, see the rejection of claims 8-10 above.

Per claims 42-44, the rejection of claim 38 is incorporated, further, they are apparatus versions of claims 35-37, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 35-37 above.

Per claims 49-51, the rejection of claim 45 is incorporated, further, they are apparatus versions of claims 35-37, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 35-37 above.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Insun Kang whose telephone number is 703-305-6465. The examiner can normally be reached on M-F 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on 703-305-9662. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

IK
3/18/2004

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